sorbent, configured for parallel flow, is used to allow continuous operation while one bed of sorbent is regenerated or replaced.

In view of the features and advantages of processes in accordance with this invention, the following examples are given. The following examples are illustrative and are not meant to be limiting. Unless otherwise indicated, percentages and ppm are on the bases of an appropriate weight.

IN THE CLAIMS

Please cancel without prejudice Claims 13 to 17 inclusive.

Kindly amend Claims 1, 2, 5, and 9 to read as follows:

1. A process for the production of fuel or blending component of fuels which are liquid at ambient conditions, which process comprises:

providing a hydrotreated, petroleum distillate feedstock comprising a mixture of hydrocarbons and sulfur-containing organic compounds, the feedstock consisting essentially of material boiling between about 200° C. and about 425° C. and having a sulfur content up to about 2,500 ppm;

contacting the hydrotreated feedstock with a gaseous source of dihydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst which exhibits a capability to enhance the incorporation of hydrogen into one or more of the sulfur-containing and/or nitrogen-containing organic compounds and under conditions suitable for hydrogenation of one or more of the sulfur-containing organic compounds; and

recovering a product comprising a mixture of hydrocarbons and other organic compounds and having a sulfur content less than about 35 ppm of sulfur.

2. The process for the production of fuel or blending component of fuels according to claim 1 wherein the hydrogenation catalyst comprises at least one active metal, selected from the group consisting of the *d*-transition elements, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst.

5. A process for the production of refinery transportation fuel or blending components for refinery transportation fuel having a sulfur content less than about 15 ppm, which process comprises:

hydrotreating a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. and having a sulfur content up to about 25,000 ppm, by a process which includes reacting the petroleum distillate with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from the hydrotreated petroleum distillate, thereby producing a hydrotreated petroleum distillate having a sulfur content less than about 500 ppm;

fractionating the hydrotreated petroleum distillate by distillation to provide at least one low-boiling blending component consisting of a sulfur-lean, mono-aromatic-rich fraction having a sulfur content less than about 15 ppm, and a high-boiling feedstock consisting of a sulfur-rich, mono-aromatic-lean fraction containing the balance of the sulfur;

contacting the high-boiling feedstock with a gaseous source of dihydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst which exhibits a capability to enhance the incorporation of hydrogen into one or more of the sulfur-containing and/or nitrogen-containing organic compounds and under conditions suitable for hydrogenation of one or more of the sulfur-containing and/or nitrogen-containing organic compounds;

recovering a liquid comprising a mixture of hydrocarbons and other organic compounds, and having a sulfur and/or nitrogen content less than the high-boiling feedstock;

treating at least a portion of the recovered liquid with a solid sorbent for a time sufficient to reduce the sulfur content of the liquid

phase and thereby obtain a product having a sulfur content less than about 15 ppm : and

blending at least portions of the low-boiling blending component and the treated product to form fuel for use in internal combustion engines, which fuel exhibits a suitable flash point of at least 38° C. as measure by ASTM D93, and contains less than 15 ppm sulfur.

9. A process for the producing a refinery transportation fuel or blending components for refinery transportation fuel having a sulfur content less than about 15 ppm, which process comprises:

providing a refinery distillate comprising a mixture of hydrocarbons, sulfur-containing and nitrogen-containing organic compounds, the mixture having a sulfur content up to about 25,000 ppm and consisting essentially of material boiling between about 200° C. and about 425° C.;

hydrotreating the refinery distillate with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from the hydrotreated distillate, to recover a hydrotreated distillate having a sulfur content less than about 500 ppm;

fractionating the hydrotreated distillate by distillation to provide at least one low-boiling blending component consisting of a sulfur-lean, mono-aromatic-rich fraction having a sulfur content less than about 15 ppm, and a high-boiling feedstock consisting of a sulfur-rich, mono-aromatic-lean fraction containing the balance of the sulfur;

contacting the high-boiling feedstock with a gaseous source of dihydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst which exhibits a capability to enhance the incorporation of hydrogen into one or more of the sulfur-containing organic compounds and under conditions suitable for hydrogenation of one or more of the sulfur-containing organic compounds;

recovering a liquid comprising a mixture of hydrocarbons and other organic compounds, and having a sulfur and/or nitrogen content less than the high-boiling feedstock;

treating at least a portion of the recovered liquid with a solid sorbent, an ion exchange resin, and/or a suitable immiscible liquid containing a solvent or a soluble basic chemical compound for a time sufficient to reduce the sulfur content of the liquid phase and obtain a product having a sulfur content less than about 10 ppm; and

blending at least portions of the low-boiling blending component and the treated product to form fuel for use in internal combustion engines, which fuel exhibits a suitable flash point of at least 38° C. as measure by ASTM D93, and contains less than 15 ppm sulfur.

Please insert Claims 18 to 25 as follows:

18. A process for the production of fuel, having a sulfur content less than about 15 ppm, for use in compression ignition internal combustion engines, which process comprises:

hydrotreating a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. and having a sulfur content in a range from about 0.1 percent by weight to about 0.9 percent by weight of elemental sulfur and a total nitrogen content in a range from about 5 ppm to about 900 ppm, by a process which includes reacting the petroleum distillate with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from the hydrotreated petroleum distillate, thereby producing a hydrotreated petroleum distillate having a sulfur content less than about 500 ppm;

fractionating the hydrotreated petroleum distillate by distillation to provide at least one low-boiling blending component consisting of a sulfur-lean, mono-aromatic-rich fraction having a sulfur content less than about 15 ppm, and a high-boiling feedstock consisting of a sulfur-rich, mono-aromatic-lean fraction containing the balance of the sulfur;

contacting the high-boiling feedstock with a gaseous source of dihydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst which exhibits a capability to enhance the incorporation of hydrogen into one or more of the sulfur-containing and/or nitrogen-containing organic compounds and under conditions

suitable for hydrogenation of one or more of the sulfur-containing and/or nitrogen-containing organic compounds;

recovering a liquid comprising a mixture of hydrocarbons and other organic compounds, and having a sulfur and/or nitrogen content less than the high-boiling feedstock;

treating at least a portion of the recovered liquid with an ion exchange resin and/or a suitable immiscible liquid containing a solvent or a soluble basic chemical compound, to obtain a treated product having a sulfur content less than about 15 ppm; and

blending at least portions of the low-boiling blending component and the treated product to form a fuel for use in compression ignition internal combustion engines, and wherein the fuel exhibits a suitable flash point of at least 38° C. as measure by ASTM D93, and contains less than 15 ppm sulfur.

A8

19. The process according to claim 18 wherein the immiscible liquid comprises an aqueous solvent containing an alkali metal hydroxide selected from the group consisting of sodium, potassium, barium, calcium and magnesium hydroxide.

20. The process according to claim 19 wherein the fuel exhibits a suitable flash point of at least 49° C.

21. The process according to claim 18 wherein the hydrogenation catalysts are the same or different and comprises at least one active metal, selected from the group consisting of the *d*-transition elements, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst.

22. The process according to claim 18 wherein the hydrogenation catalyst comprises one or more metals selected from the group consisting of cobalt, nickel, molybdenum and tungsten.

23. The process according to claim 9 wherein the fuel exhibits a suitable flash point of at least 49° C.